



April 19, 2013

Project No. 8128.01.20

Mr. Dana Bayuk

Oregon Department of Environmental Quality

2020 SW 4th Avenue, Suite 400

Portland, Oregon 97201-4987

Re: Soil Vapor and Combustible Gas Evaluation Work Plan

Siltronic Corporation

7200 NW Front Avenue, Portland, OR

ECSI No. 183

Dear Mr. Bayuk:

On behalf of Siltronic Corporation (Siltronic), Maul Foster & Alongi, Inc. (MFA) has prepared this work plan in response to a requirement from the Oregon Department of Environmental Quality (DEQ) to evaluate soil vapor and combustible gas in the vicinity of monitoring well WS40-36 and inside the Fab 1 building.

## BACKGROUND

Based on the results of the soil vapor and combustible gas indicator (CGI) monitoring developed for the enhanced in situ bioremediation (EIB) injections, a soil vapor mitigation system was installed as a contingency measure during the EIB work performed between December 2010 and August 2011. In a memorandum dated February 27, 2012, MFA summarized soil vapor and CGI data collected from December 2010 through January 2012.

Based on subsequent data collected through August 2012, Siltronic recommended modifications to the soil vapor sampling and CGI monitoring program, including further investigation of combustible gas near monitoring well WS40-36 and Fab 1, described in a November 29, 2012, letter to DEQ. The recommendation was based on 97 percent of CGI readings from monitoring well WS40-36 exceeding 10 percent of the methane lower explosive limit. Although readings were consistent with the methanogenic fermentation of EHC in that area, additional CGI reconnaissance was recommended in this area and in the Fab 1 building to determine if continued CGI monitoring is warranted.

During a meeting between Siltronic and DEQ on February 19, 2013, the soil vapor and CGI monitoring program was discussed. As a result, Siltronic's recommendations were approved with the incorporation of DEQ comments presented in a February 22, 2013, e-mail. In the e-mail, DEQ directed Siltronic to collect additional combustible gas reconnaissance samples and install soil vapor monitoring points to delineate the extent of combustible vapors in the vicinity of monitoring well WS40-36 and inside Fab 1.

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This work plan describes MFA's recommended approach for installing soil vapor monitoring points and collecting CGI measurements in response to DEQ's direction.

## SAMPLING APPROACH

MFA recommends installation of two soil vapor monitoring points, two subslab vapor monitoring points colocated with two indoor air samples inside Fab 1, and multiple CGI measurements. The proposed sampling locations shown on the attached figure are approximate and subject to field modification, based on accessibility and subsurface utilities.

The proposed soil vapor, CGI, and subslab/indoor air samples will be collected on a bimonthly basis for, at minimum, one year to account for soil vapor concentration variations in response to environmental factors (e.g., fluctuations in the water table, seasonal variability). Under the DEQ-approved revisions to the current soil vapor monitoring program, soil vapor is monitored semiannually and CGI measurements are collected bimonthly.

CGI measurements will be collected at locations including fixed points (i.e., monitoring well monuments), ground features (i.e., gravel areas), and building features (i.e., joints or cracks). A bar hole probe inserted into the soil will be used to collect combustible gas samples from the two locations shown on the attached figure.

Soil vapor, subslab vapor, and indoor air monitoring points will be installed using the methods and equipment previously approved by DEQ and consistent with previous investigations<sup>1</sup> at the site, including the approved modifications.

Public and private utility-locating services and other information sources will be used to check for underground utilities before work begins. MFA will coordinate fieldwork to locate possible on-site utilities and piping or other subsurface obstructions.

## LABORATORY ANALYSIS

Soil vapor samples will be collected using methods and equipment previously approved by DEQ, and consistent with previous investigations<sup>2</sup> at the site.

The soil vapor and subslab/indoor air vapor monitoring points will be analyzed for site-related chlorinated volatile organic compounds (cVOCs) by Modified USEPA Method TO-15 Hi/Lo to achieve low reporting limits similar to the DEQ's risk-based concentrations (RBCs) for cVOCs, last revised on June 7, 2012. Helium is used to test for sampling system

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<sup>1</sup> Specifically including MFA's April 12, 2011, *Supplemental Injection Program Performance Monitoring Plan*; July 22, 2011, *Subslab Soil Vapor Work Plan*, and the February 27, 2012, *Documentation of Supplemental EIB Injection Work*.

<sup>2</sup> See footnote 1.

leaks; therefore, the samples will also be analyzed for helium by ASTM D1946 to verify that helium did not enter the sampling system. Air Toxics of Folsom, California, will provide a 6-liter, stainless steel canister (Summa<sup>®</sup> canister) for each sample.

MFA will receive the data electronically from the laboratory, and the data will be transferred to an EQuIS<sup>®</sup> database. MFA will perform a quality assurance and quality control (QA/QC) review of the EQuIS<sup>®</sup> electronic data deliverable file received from the laboratory. The QA/QC review will include the elements of a Tier II data validation review. To document data reliability, a memorandum will be prepared summarizing evaluation procedures, the usability of the data, and deviations from specific field and/or laboratory methods.

## REPORTING

Data collected as part of this investigation will be used in conjunction with the results of other previously or concurrently submitted data to evaluate the full extent of soil vapor levels and to support recommendations to modify the soil vapor and CGI monitoring program. Subslab soil vapor and colocated indoor air results will be screened against applicable DEQ RBCs for occupational vapor intrusion in anticipation of potential Fab 1 operations.

After the data have been received and evaluated, MFA and DEQ will discuss the results to identify next steps.

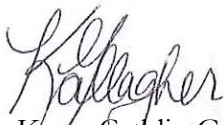
## SCHEDULE

If possible, Siltronic would like to collect the samples described in this work plan concurrently with other investigations in order to reduce mobilization costs. MFA is prepared to begin work immediately upon DEQ approval of the proposed approach, subject to availability of required equipment.

Please call or e-mail if you have any questions regarding this work plan.

Sincerely,

Maul Foster & Alongi, Inc.



Kerry-Cathlin Gallagher  
Project Scientist



James G.D. Peale, RG  
Principal Hydrogeologist

Attachment: Figure

Mr. Dana Bayuk  
April 19, 2013  
Page 4

Project No. 8128.01.20

cc: Myron Burr, Siltronic Corporation  
Alan Gladstone, Davis Rothwell Earle & Xochihua, P.C.  
Chris Reive, Jordan Schrader Ramis  
Jim Anderson, DEQ  
Kristine Koch, USEPA  
Sean Sheldrake, USEPA Seattle  
Rene Fuentes, USEPA Seattle  
Chip Humphrey, USEPA Portland  
Lance Peterson, CDM  
Bob Wyatt, NW Natural  
Patty Dost, Pearl Legal Group LLC  
John Edwards, Anchor QEA LLC  
Carl Stivers, Anchor QEA LLC  
Rob Ede, Hahn and Associates, Inc.  
Tom Gainer, DEQ  
Henning Larsen, DEQ  
Matt McClincy, DEQ

FIGURE





# Figure Proposed Soil Vapor and CGI Investigation Locations

Siltronic Corporation  
Portland, Oregon

## Legend

- Monitoring Well Location
- Injection Location

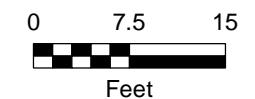
Injection Areas

Proposed Areas to Be Monitored  
for Combustible Gas using CGI

Gravel Areas

## Proposed Sample Locations

- Soil Vapor Monitoring Location
- Subslab Soil Vapor and  
Indoor Air Monitoring Location
- Soil Monitored for Combustible  
Gas using Bar Hole Probe & CGI



Source: Aerial photograph obtained from ESRI,  
Inc. ArcGIS Online.

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p. 971 544 2139 | www.maulfooster.com

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